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GENERALIZED ABOVEGROUND PLANT SYMPTOMS PRODUCED BY BELOW GROUND NEMATODE INFESTATIONS

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Aboveground symptoms resulting from nematodes attacking plant roots are not advertised as boldly as symptoms caused by insects or many plant diseases. For example: the multicolored blotch on a leaf caused by a fungus, the mottled varigated surface of a virus stricken leaf, the foul odor and putrefaction associated with some bacterial diseases, or the gaping holes in the leaf rent by the mandibles of an insect. Nematode injury is more generalized and subtle in appearance and progression than any of the aforementioned.

A characterisitic pattern of nematode symptoms occurs in most plants as follows:

1) Slow Decline: Slow decline progresses in time, and it may be months or years before it is strongly expressed or detected. Consequently the inspector or grower rarely sees this symptom in progress but instead sees the end result, a declining group of plants (Fig. 1). Decline symptoms are often accentuated by stress in a plant caused by water shortage or nutrient deficinecy. In such cases, nematode afflicted plants in a group of plants may become severely wilted or exhibit the symptoms caused by the deficient mineral.

Figure 1. Left: Citrus trees in late stages of decline. Right: Healthy citrus trees.

2) Slow Chlorosis: Foliar yellowing progresses in time, and only the end result is obvious. The end result usually appears as a yellowed group of plants surrounded by or bordered by healthy green plants.

3) Gradual Stunting: As in slow decline and chlorosis, only the end result is obvious to most observers (Fig. 2). The end result of gradual stunting usually appears in a field planting as a depressed area surrounded by or bordered by a group of healthy green plants (Fig. 3A). A characterisitic profile is presented by the stunted areas (Fig. 3B).

4) Slowly Widening Circles: All three of the aforementioned symptoms appear in slowly widening circles (Fig. 4) whose rate of progression depends on the kind of nematode present and existance of favorable conditions for its reproduction and development. Again these circles progress in time, and usually only the end result is noticed,

Figure 2. Pine seedings of the same age. A: Stunted by the sting nematodes. B: Healthy.

Summary: After a period of subtle decline by the plants, an area of nematode afflicted plants appear as a roughly circular area of stunted, yellowed plants surrounded or bordered by healthy plants. This final condition, however, can be confused with symptoms caused by some plant disease or insects that attack roots so that soil and root sample should always be taken to confirm the observers suspicion of a possible nematode problem.

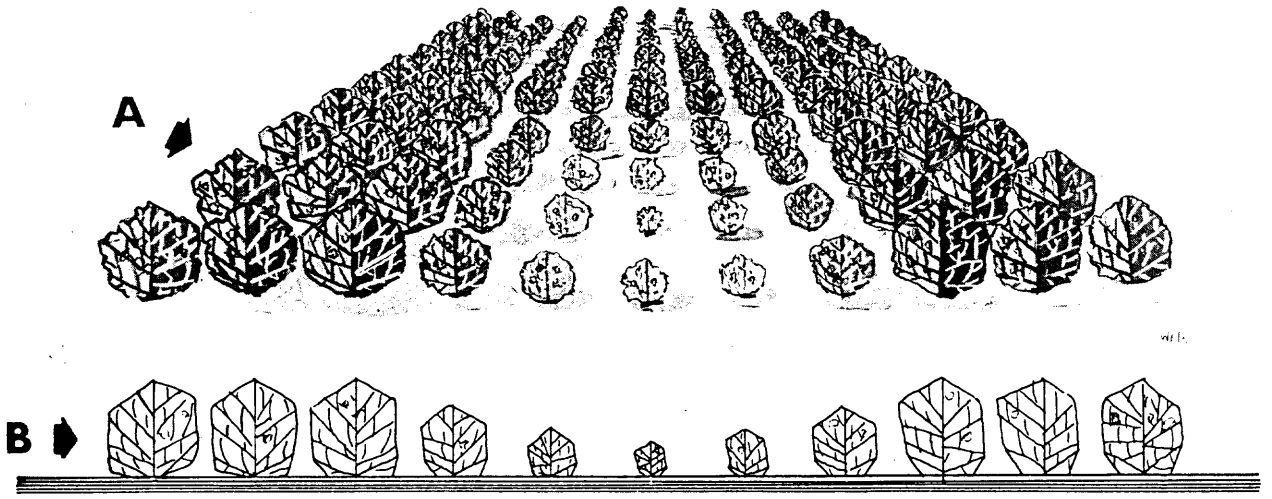

Figure 3. A: Depressed area in a group of plants. B: Profile of a depressed area.

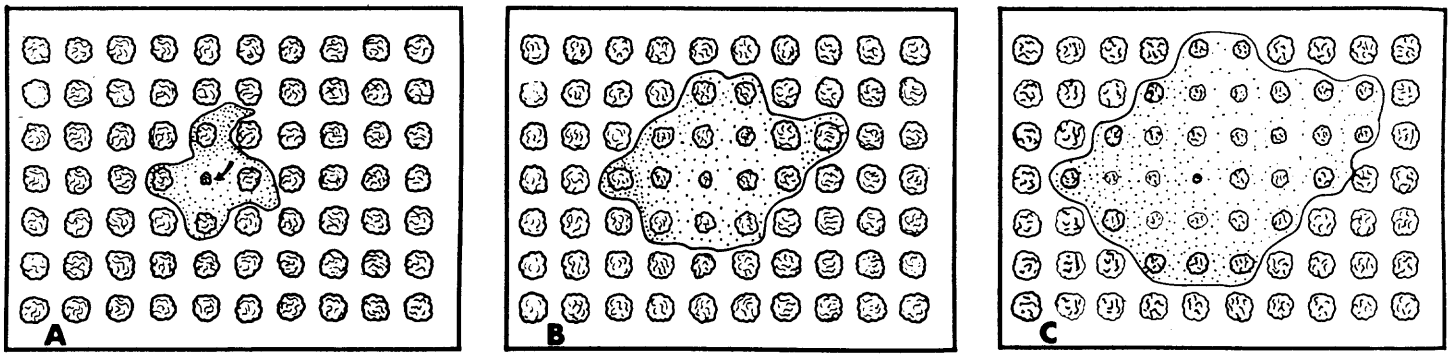

Figure 4. A: Four trees affected by spreading decline from a burrowing nematode infected citrus reset (arrow). B: One year later about 15 trees will have become infected. C: Two years later 30 to 40 trees willl have become infected. If no preventive measures are taken, the entire planting will be overtaken by spreading decline.